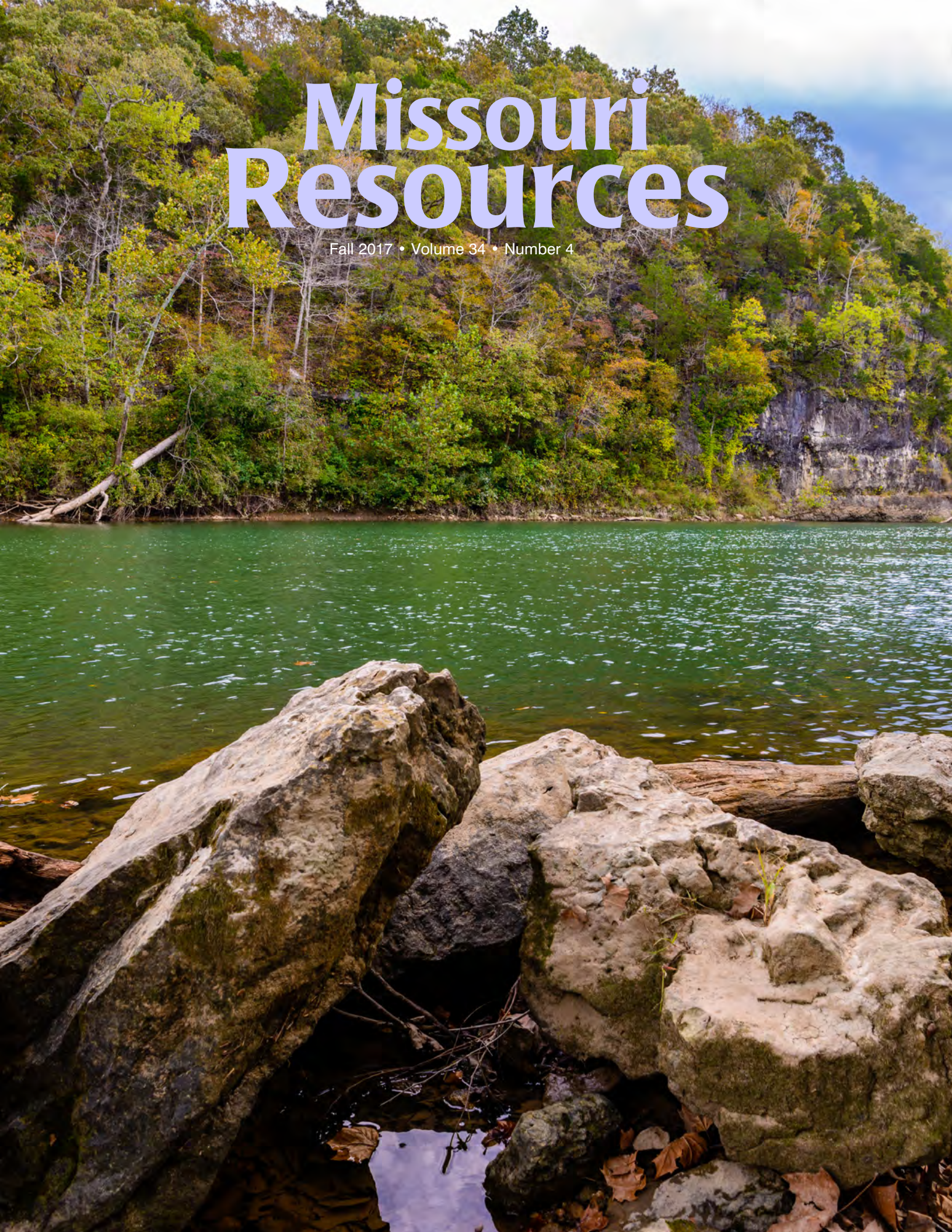
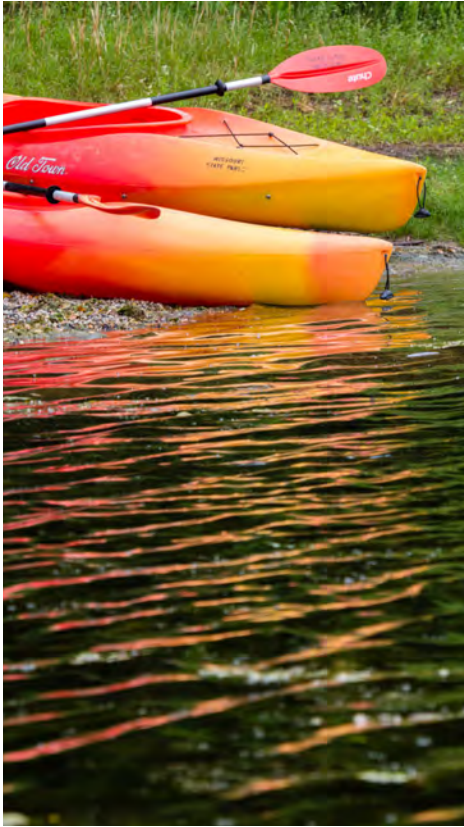


Missouri Resources

Fall 2017 • Volume 34 • Number 4





Missouri Resources

Fall 2017 • Volume 34 • Number 4

GOVERNOR OF MISSOURI Eric R. Greitens
DEPARTMENT DIRECTOR Carol S. Comer
DEPUTY DIRECTOR Dru Buntin
DIRECTOR, DIVISION OF ADMINISTRATIVE SUPPORT Julie A. Allen
DIRECTOR, DIVISION OF ENVIRONMENTAL QUALITY Ed Galbraith
DIRECTOR, MISSOURI STATE PARKS Ben Ellis
DIRECTOR, MISSOURI GEOLOGICAL SURVEY Joe Gillman
**DIRECTOR, ENVIRONMENTAL IMPROVEMENT
AND ENERGY RESOURCES AUTHORITY** Karen Massey

COMMUNICATIONS DIRECTOR Connie Patterson
DEPUTY COMMUNICATIONS DIRECTOR Renee Bungart

EDITOR	EDITORIAL BOARD
Stuart Westmoreland	Andrea Balkenbush
DESIGN DIRECTOR Belinda Hughes	Connie Patterson
PHOTOGRAPHERS Ben Nickelson	Hylan Beydler
Andrew Richmond	Brian Quinn
ASSISTANT EDITOR Andrew Richmond	Renee Bungart
	Stuart Westmoreland

As a recipient of federal funds, the Department of Natural Resources cannot discriminate against anyone on the basis of race, color, national origin, religion, age, sex, disability, sexual orientation or veteran status.
If anyone believes he or she has been subjected to discrimination for any of these reasons, he or she may file a complaint with either the Department of Natural Resources or the Office of Equal Opportunity, U.S. Department of the Interior, Washington, D.C., 20240.

ABOVE
Kayaks rest on the shore of Peabody Lake at Finger Lakes State Park, near Columbia.
MoDNR PHOTO BY BEN NICKELSON

ON THE FRONT COVER
A smattering of yellow and orange colors emerge in the foliage of a Meramec River bluff, viewed from Meramec State Park.
MoDNR PHOTO BY BEN NICKELSON

ON THE BACK COVER
Fall leaves float along Turkey Creek, framed by a Katy Trail Bridge.
MoDNR PHOTO BY BEN NICKELSON

CONNECT WITH MoDNR



CONNECT WITH MoDNR STATE PARKS



table of contents



4 Inside MoDNR's Chemical Analysis Section
BY KEVIN THOENEN
With more than one-quarter million test results produced annually, 21 department lab staff have their beakers full.

8 Experiencing a Total Solar Eclipse
BY SUE HOLST
You knew it was finally beginning to happen. Even before the temperature started to drop, the early autumn light was beginning to fade.

12 Creating Pollinator Habitats
BY GREG SNELLEN
Which declined first, our precious pollinators or the habitat they so desperately require? Regardless of the answer, here's a solution.

departments

- 15 Focus on Fossils**
- 16 Did You Know?**
- 18 Career Connection**
- 19 Explore Missouri**
- 22 Top Spots**
- 24 Trail Highlight**
- 26 ... But Not Least**

ABOVE
Visitors participating in the Total Eclipse of the Katy Bicycle Ride view the eclipse at the Hartsburg trailhead.
MoDNR PHOTO BY BEN NICKELSON



Testing...Testing: Inside MoDNR's Chemical Analysis Section

by Kevin Thoenen

The Missouri Department of Natural Resources' Chemical Analysis Section is located at 2710 W. Main St. in Jefferson City and was built in 1991. Part of the Division of Environmental Quality's Environmental Services Program, the laboratory receives 25,000 samples per year; performs 70,000 tests and reports more than 250,000 results annually. Approximately 75 percent of the samples analyzed by the section come from approximately 2,700 drinking water supplies that serve more than 5.5 million

Missouri residents. They receive one-fifth of those samples each year from June to September for the Lead and Copper Rule compliance. During the peak times, the metals lab analyzes more than 300 lead and copper samples per week.

Missouri has a statute allowing a portion of the fees collected from a public water system to fund the laboratory services. Other sample analyses and results fees are used to support environmental emergency responses, stream quality monitoring, air quality monitoring and wastewater treatment plant and hazardous waste facility compliance.

"We strive to provide the highest level of customer service for our (MoDNR) client programs," said Brian Allen, director of the department's Environmental Services Program.

The internal client programs include the Hazardous Waste Program, Water Protection Branch, Air Pollution Control Program, Division of State Parks and Solid Waste Management Program.

Staff: The Chemical Analysis Section employs 21 full-time employees with the lab divided into three units: inorganic chemistry, organic chemistry and

Missouri Department of Natural Resources State Environmental Laboratory



MoDNR Chemical Analysis Section, Front row, from left: Kevin Richter, Will Bledsoe, Jeff Wilson, Lori Antweiler, Stephanie Romans, Alycia Stroup, Shelby Koelling and Tonya Toebben. **Second Row:** Curtis Lueckenhoff, Terri Zumalt, Robert Schaub, Micah Lambeth, Stephen Jackson, Jim Nahach, Richard Kirsch and Tarun Choudhury. **Back row:** Josh Hill, Brittany Meder, Natalie Grothoff, Kevin Thoenen (Not pictured: Jaymee Kempker).

MoDNR PHOTOS BY BEN NICKELSON

sample management. The Inorganic Chemistry Unit has seven bench chemists and a supervisory unit chief. The Organic Chemistry Unit has six bench chemists and a supervisory unit chief. The Sample Management Unit consists of four sample custodians with a supervisory unit chief. Kevin Thoenen is the laboratory manager.

Budget/funding sources: The laboratory's annual operating budget is approximately \$1.7 million with its staff salaries funded through the MoDNR client programs listed previously.

"Each client program's portion is based on the annual percentage of sample analyses we perform for them," said Thoenen.

Types of analysis conducted:

Inorganic chemistry: The Chemical Analysis Section

performs analyses for 37 methods and 62 individual analytes. These include up to 30 individual metals analysis on potable and non-potable waters, soils and lead air filters (approximately 150 filters per month). Another two dozen specific analyses also are performed.

Organic chemistry: The Chemical Analysis Section performs analysis for 21 methods and 434 individual analytes. These include analysis for potable and non-potable waters, soils and organic matrices tested for numerous contaminants.

Laboratory certification services: The Chemical Analysis Section also provides for the certification of laboratories in Missouri to perform drinking water chemical analysis. Five staff serve as certification officers and conduct onsite assessments for four laboratories in Missouri. They also provide reciprocal certification for 14 additional laboratories. These tasks are performed in addition to the normal duties of the staff.

"One of the biggest challenges we face is balancing the large volume of samples and producing the high quality data our clients have come to expect," said Thoenen, who details several factors to the lab's success in this area:



(Far left) Chemist Alycia Stroup performs a quality control peer review to ensure accuracy of reported data.
(Inset) Chemist Josh Hill loads samples into a gas chromatography instrument for drinking water disinfection.

MoDNR PHOTOS BY BEN NICKELSON

manages quality control and generates final reports."

The system allows high sample throughput while tracking accuracy and to ensure we meet our client's and EPA's data quality objectives.

- "We added a Quality Assurance Manager in September 2012. This position performs internal auditing functions independent of my duties as laboratory manager." These functions include data package review and chemical analysis procedure audits to ensure the best quality control.
- "We allow our staff flexible work schedules to accommodate varying workloads, including analyzing time-sensitive samples," concluded Thoenen.

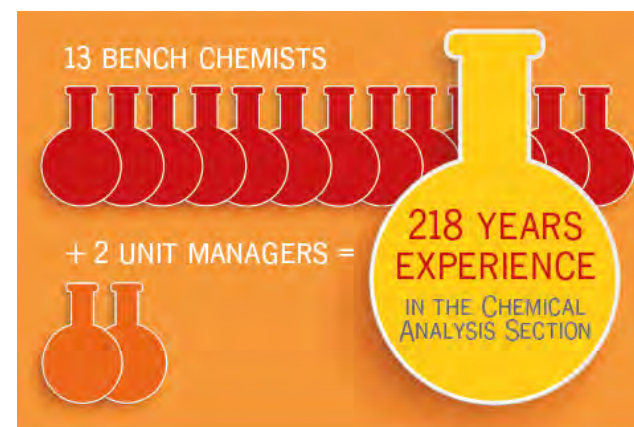
The 13 bench chemists and two unit managers collectively have 218 years of experience.

"The expertise and experience of our chemists is irreplaceable for troubleshooting when problems arise," said Allen. "Our staff's ability to quickly work around those glitches is another reason for the lab's numerous accomplishments."

In every laboratory, the chemists are cross trained to perform all testing in that laboratory. This allows for smooth throughput during unforeseen absences.

"We encourage all chemists to learn new procedures in other laboratories as their schedule allows," added Thoenen. "Our chemists take abundant pride in what they do, and their loyalty and dedication is a testament of their remarkable public service."

More information on the Missouri Department of Natural Resources' Environmental Services Program is available at dnr.mo.gov/env/esp.



- "We rely on new technologies ... to enhance efficiency in every area of the laboratory." Automated processes allow instrumentation to perform some overnight testing in the absence of lab personnel.
- "Our Laboratory Information Management System organizes workflows, tracks samples,

Experiencing a Total Solar Eclipse

by Sue Holst



This composite photo illustration showcases the pre- and post-phases of the eclipse within an HDR image of totality in the center of the frame. The images were shot at a location between Fulton and New Bloomfield, where viewers experienced 2 minutes and 39 seconds of totality.

MoDNR PHOTO ILLUSTRATION BY ANDREW RICHMOND

For two minutes on Aug. 21, everything stopped.

In parts of Missouri and the entire nation, people stopped what they were doing and looked skyward to experience a total solar eclipse.

Interpreting important times and events in Missouri’s history is part of the mission of Missouri State Parks. On Aug. 21, everyone was privileged to witness as a new chapter in Missouri history was written during a total solar eclipse. The last time Missourians could stand in their own back yard and see such an event was nearly 150 years ago.

Throughout Missouri, state parks and historic sites – especially those in the path of totality – presented programs and events ranging from an exhibit to view moon rocks to programs on astronomy and solar energy. On Katy Trail State Park, more than 400 bicyclists experienced the solar eclipse during the “Total Eclipse of the Katy” trail ride. The ride was from Rocheport to Jefferson City and many of them stopped along the trail to witness the event.

Visitors to the south lawn of the Capitol had the opportunity to tour the NASA Journey to Tomorrow trailer and meet two Missouri-born astronauts who spent time in space. There also were many other events on the Capitol lawn and throughout the city.

Regardless of where any one was at the time – biking a trail,

(Above right) Katy Trail riders view and photograph the eclipse during totality at the Hartsburg trailhead.

MoDNR PHOTO BY BEN NICKELSON

(Right) The “diamond ring” effect can be seen just before and just after totality as the last bit of sun shines around the moon’s edge.

MoDNR PHOTO BY ANDREW RICHMOND



attending a special program or having a barbecue with family and friends – the one thing they all had in common was the urge to look toward the sun and witness a spectacular solar event. For many, it was a once-in-a-lifetime experience.

Sue Holst, who recently retired, was a Public Information Officer for Missouri State Parks, a division of the Missouri Department of Natural Resources.



(Below left) The fast shutter speed used for this photograph during totality displays the chromosphere of the sun and two solar prominences, seen in red.

MoDNR PHOTO BY ANDREW RICHMOND

(Below right) NASA presents a photo of Missouri’s astronauts to Gov. Eric Greitens and MoDNR Director Carol S. Comer (far left) at the Missouri State Capitol.

MoDNR PHOTO BY ELLEN FERRELL

(Bottom) Missouri State Parks provided telescopes with solar filters for Katy Trail riders and guests to safely view the eclipse at the Hartsburg trailhead.

MoDNR PHOTO BY BEN NICKELSON



Creating Pollinator Habitats

Reclaimed Mine
Lands Offer
Wildflower
Safe Havens

by Greg Snellen



Hundreds of thousands of flowering plant species rely on pollinators to fertilize them by transferring pollen between flowers, which leads to seed, fruit and vegetable production. Butterflies, bees and beetles, along with birds and some small mammals, are responsible for pollinating the majority of crops in Missouri.

Unfortunately, native wildflowers vital to those pollinators' lifecycles are decreasing in abundance throughout the state. Therefore, protecting and enhancing Missouri pollinator habitats has become a major priority.

The Missouri Department of Natural Resources' Land Reclamation Program is helping protect pollinators using science-based habitat conservation and restoration measures for reclamation projects on abandoned coal-mine lands. Department staff rank and select projects based on the severity of health, safety and environmental impacts. Project funding for reclamation is provided by the U.S. Department of the Interior's Office of Surface Mining Reclamation.

Working with landowners is a critical component to successfully completing reclamation projects, especially for understanding what to plant. Choosing

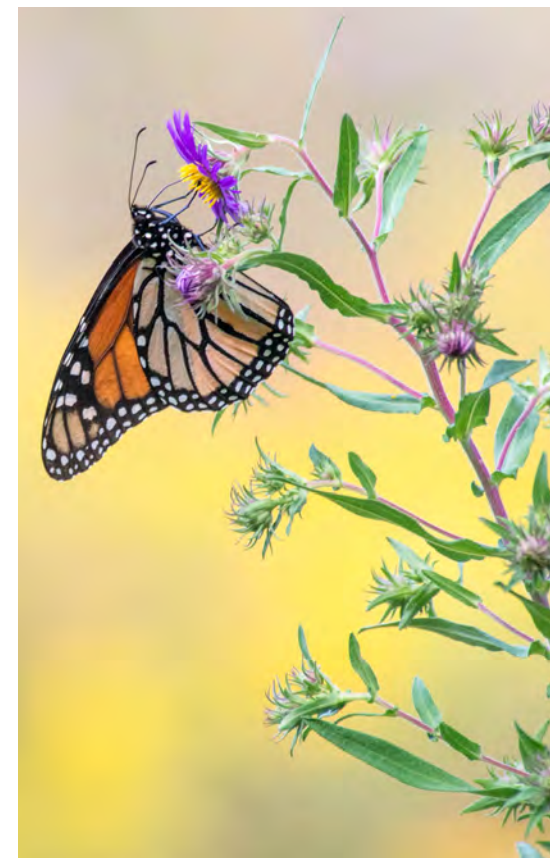
a cover type generally means selecting between two options: pasture for grazing or native grass for wildlife cover. The department's initiative is helping to add plants to the mix such as: common milkweed, butterfly milkweed, purple prairie clover, plains coreopsis, partridge pea and Illinois bundleflower.

In 2016, 11 acres were planted on a site in Henry County, near Calhoun, using a mixture of native grasses and plants.

"Everything that the Land Reclamation Program has done on my property has been beneficial and I'm extremely satisfied," said landowner Terry Bath. "I'm a farmer, so I'm also concerned with ensuring pollinator insects are around in the future and can pollinate my crops," he added.

Additionally, a 56-acre site of open-field habitat was reclaimed near Montrose. A diverse native plant mixture that includes many pollinator species will be planted next year.

"The reclamation of my property has been a good experience. It is everything I anticipated and more. I'm already seeing a lot more turkeys [as result of reclamation]," said landowner Rick Seibel. "I'm glad



(Top left) Reclaimed chat piles at Prairie State Park, in Jasper County, support wildflowers such as plains coreopsis.

MoDNR PHOTO BY BEN NICKELSON

(Top right) Butterfly milkweed is a favorite for monarch butterflies.

BRUCE SCHUETTE PHOTO

(Left) A monarch feasts on the purple flowers of a New England aster plant, a native wildflower found throughout the state.

MoDNR PHOTO BY BEN NICKELSON

(Above) Purple prairie clover is a native Missouri prairie clover, which is found in glades, rocky open woods and prairies throughout the state.

BRUCE SCHUETTE PHOTO



(Left) Lanceleaf coreopsis is native to Missouri and a favorite of pollinators.

MoDNR PHOTO BY BEN NICKELSON

(Below left) Common milkweed supports many butterfly species, such as pipe-vine swallowtails.

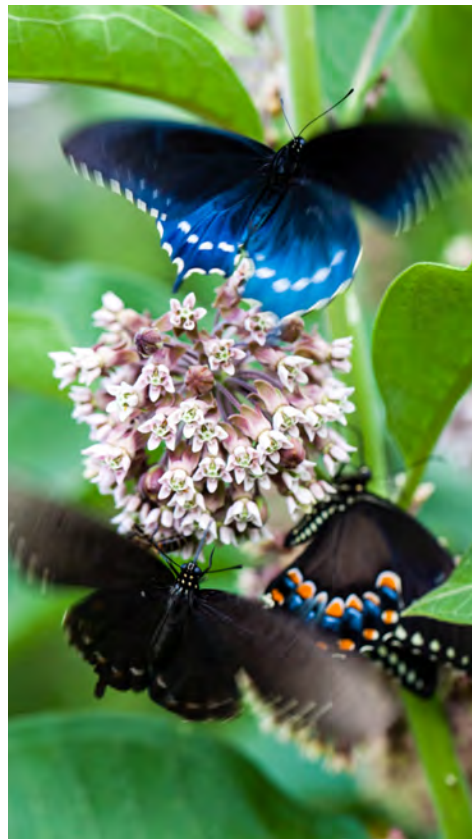
MoDNR PHOTO BY BEN NICKELSON

(Below) A 56-acre tract, near Montrose in Henry County, had several areas with barren spoil and acid mine seeps that were discharging offsite.

MoDNR PHOTO BY CHRIS BOBRYK

(Bottom) A diverse native plant mixture that includes pollinators will be planted next year to replace the temporary annual cover planted in 2017.

MoDNR PHOTO BY BEN NICKELSON



to help with preventing the loss of pollinator insects.”

Learn more about abandoned mine lands and funding opportunities online at dnr.mo.gov/geology/lrp/reclamation/aml/amlinfo.htm.

Greg Snellen is an environmental supervisor with MoDNR's Division of Environmental Quality's Solid Waste Management Program. He previously served as an environmental specialist with the department's Missouri Geological Survey's Land Reclamation Program.

focuson fossils



(Top) Planispiral snail *Bellerophon crassus* is from 300-million-year-old Upper Pennsylvanian Kansas City Group Westerville Limestone in Kansas City, Jackson County, Mo. It measures 2 inches from left to right.

(Above) Conispiral snail *Euconospira turbiniformis* is from Kansas City Group Winterset Limestone in Lee's Summit, Jackson County. It is 1.2 inches tall. See fossils at the Ed Clark Museum of Missouri Geology. More information is online at bit.ly/2gDYs18.

MoDNR PHOTOS BY BEN NICKELSON

gastropods

Gastropods are a class of mollusk animals that includes snails and slugs. Gastropods came into existence during the earliest part of the Paleozoic Era about 520 million years ago and persist to present day in a variety of forms and lifestyles.

Most gastropods move around by crawling slowly on a fleshy foot that resembles a belly; hence the name gastropod, which was derived from the Greek gastro (stomach) and pod (foot). The foot of some gastropods is adapted for swimming.

The original gastropods were marine and had gills for respiration. In late Paleozoic time, gastropods having an air-breathing lung, called pulmonate gastropods, came on the scene and populated land and fresh water environments. Both kinds are still around today.

Snails have a one-piece outer shell that houses and protects soft body parts. Slugs lack a shell. Since hard body parts are far more likely to be preserved than soft body parts, the fossil record of gastropods is almost entirely shells of snails. Slug fossils are virtually nonexistent. Therefore, the number of extinct species probably far exceeds the 15,000 documented to have existed in the geologic past. The number of living species is estimated to be between 40,000 and 100,000.

Shells are made of calcium carbonate in the form of the minerals aragonite or calcite or both. Shells can be uncoiled or coiled. Uncoiled shells are cap-shaped to horn-shaped. Coiled shells wrap around themselves spirally as they grow. Each wrap constitutes a whorl. Planispiral shells are coiled in a plane and exhibit bilateral symmetry. Conispiral shells are coiled helically and lack bilateral symmetry. Planispiral snails became extinct at the end of the Paleozoic Era. Uncoiled and conispiral snails still survive today.

Some marine snails have a horny to calcareous trap door (operculum) with which they can seal themselves tightly inside their shells. It allows them to wait out periods of environmental stress.

The gastropod mouth is equipped with a horny apparatus (radula) that is used for scraping and boring. Gastropods eat just about anything. Some scavenge dead plant and animal matter, including fecal matter. Some eat algae and other live plant material. Some are commensal, like the horn-shaped snails that lived attached to the anal sacs of crinoids during the Paleozoic. Some are parasitic. Others are predators capable of boring holes through shells to gain access to tasty innards of the animal inside.

Gastropods belong to the Kingdom: Animalia, Phylum: Mollusca (includes gastropods, pelecypods, scaphopods, cephalopods and chitons), and Class: Gastropoda.

In partnership with the Missouri departments of Natural Resources and Conservation

U.S. Army Corps of Engineers Conducts Feasibility Study of the Lower Grand River Basin

Focus of Study: The study is addressing recognized problems in this area including flooding, sedimentation, bank erosion, log jams, and loss of important aquatic and wetland habitats.

Anticipated Outcome: A report potentially leading to authorization and funding of construction projects(s) cost shared 65 percent by the Corps, 35 percent by state and other partners.



MoDNR PHOTO BY BEN NICKELSON



MISSOURI DEPT. OF CONSERVATION PHOTO



MoDNR PHOTO

Problems

- Log jams
- Increased frequency and duration of flooding
- Excessive sediment deposition
- Stream bank erosion
- Loss of farmland
- Threats to infrastructure
- Loss of aquatic habitat, wetlands and bottomland hardwoods

Potential Solutions

- Bank stabilization/stream restoration
- Sediment/debris retention

- Grade control/rock riffles
- Native habitat buffers
- Voluntary levee breaches
- Sheet and rill/gully erosion best management practices
- Stream/flow restoration
- Channel re-alignment/meander
- Log jam removal
- Log interception
- Habitat restoration
- Floodplain restoration
- Flow conveyance improvements

(Opposite page, left) A log jam blocks Locust Creek in Pershing State Park in July 2014.
(Opposite page, top right) An extreme example of stream bank erosion.
(Opposite page, bottom right) The creek bed of Locust Creek at Pershing State Park after being cleared.
(Below left) Cordgrass Bottoms Natural Area at Prairie State Park was primarily covered in prairie cordgrass in 1979.
(Below right) By October 2013, the cordgrass was buried by sediment and replaced by invasive species.



MoDNR FILE PHOTO



MoDNR FILE PHOTO

	Public scoping input - fall 2017	Draft report public review - fall/winter 2018	Will require congressional authority and funding	
	Feasibility 3 years	Design 2 years	Construction 3+ years	Operation/ Maintenance/ Benefits
Cost Share	50% Federal 50% State	65% Federal 35% State/Local	65% Federal 35% State/Local	0% Federal 100% State/Local



For more information visit our website at: [Bit.ly/2GrandRiv](https://bit.ly/2GrandRiv) or nwk.usace.army.mil/Missions/Civil-Works/Civil-Works-Programs-And-Projects/Grand-River-Basin

Or Contact:
Tim Rielly, MoDNR 573-526-3353 Tim.Rielly@dnr.mo.gov
Stuart Miller, MDC 573-522-4155 x3378 Stuart.Miller@mdc.mo.gov
Kaely Megaro, USACE 816-389-2348 Kaely.M.Megaro@usace.army.mil



Steve Feeler

Deputy Director,
Missouri Department of Natural Resources,
Division of Environmental Quality

MoDNR PHOTO BY BEN NICKELSON



What is your job at MoDNR?

I have worked for the department for 37 years. My primary job is to serve as liaison between the programs and the division, as a problem solver to help them with their daily issues. I also work with the human resource issues for the

division and serve as the human resource liaison for the division.

Finishing up his career with 37 years at MoDNR, Feeler got his start in the Air Pollution Control Program's enforcement section, soon advancing to chief of enforcement. This section ensures compliance by entities subject to air pollution regulations. Thirty years later, Feeler moved to his present position, where he serves as the administrative liaison to five division programs.

What are some duties that you encounter on a daily basis?

Each day, I field questions from the programs trying to solve whatever problems they are running into. If they have hot issues, I alert upper management to those. I try and help them to make sure they know what their job functions are and try to offer options to help them complete their job obligations. I also sign off on hiring that needs to be approved.

What do you like most about working for MoDNR?

Working with people, with our own staff, helping to educate young people on what they're doing to help them to understand how their job helps to improve and protect the environment. I enjoy working with external stakeholders, trying to help them through the environmental regulations process. I offer technical assistance so they can more easily understand that component. They learn that what they're doing really is for the environment – it's not just paperwork to make their jobs more complicated.

How does your job help to enhance Missouri's natural resources?

Well, I think that providing the technical assistance that I do, I act as a facilitator between the stakeholders and the department. Anything that we can do to help people grasp how to comply with regulations helps them and helps the environment.

What would you say to someone considering a career with the department?

The thing about working for the Department of Natural Resources is, it's very diverse, very interesting work. Young people that come in straight out of school get great training here. Some begin as interns. You learn quicker than I believe you would in the private sector and the opportunities are just pretty endless here. You can move around in different programs, different environmental focuses. It's a growing field – the environmental field is a wide-open space of opportunities. You get to meet a lot of people, really get exposed to a lot of different things very quickly. MoDNR is a great training ground from which to move on to something else, or start a career. It's very rewarding and fulfilling.

"Starting my career in enforcement helped prepare me for my current position by requiring me to solve problems on a daily basis. It also required me to be creative in finding solutions that would work for both sides. It exposed me to people from all walks of life that the department regulates. It taught me the need for education and assistance in our business."

Go to dnr.mo.gov/hr and join a great team, start a great career and achieve a great purpose.



Watch Feeler's interview on YouTube.

MoDNR PHOTO BY ANDREW RICHMOND

Harry S Truman Birthplace State Historic Site

by Sue Holst



The small frame home in Lamar is an example of Truman's humble beginnings.

MoDNR PHOTO BY BEN NICKELSON

Motivational speakers often say, “It’s not where you start – it’s where you finish.” For Harry S Truman, his start was in a small white frame house in Lamar, Mo., and his finish line was the prestigious White House in Washington, D.C.

Truman, the 33rd President of the United States, was born May 8, 1884, in a house that today is preserved as Harry S Truman Birthplace State Historic Site. According to the official deed, the Trumans purchased the 20 by 28-foot house for \$685 in 1882. Truman was born in the downstairs southwest bedroom of the one and one-half story house. To celebrate the birth of his first child, Truman’s father planted an Austrian pine tree at the southeast corner of the house.

Today’s visitors to the site can see the simple house

where Truman was born and observe furnishings that reflect what a house in western Missouri would have looked like during that time. Free tours of the home are available.

The Austrian pine tree that Truman’s father planted at his birth is gone but its legacy continues. When the original pine died, its seeds were used to produce “descendants” and guests today can see these pines growing at the site. Lumber from the original pine was used to make pieces of furniture for the Truman birthplace.

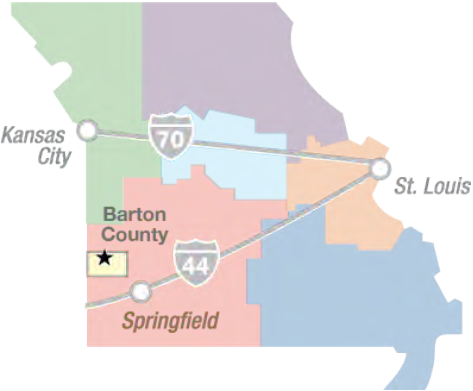
When Truman was 11 months old, his family moved from Lamar to the Kansas City area and finally settled in Independence. His humble beginnings and hard work as a young boy helped shape his character throughout his life.



The United Auto Workers donated the home to the state for preservation as a state historic site. The site was dedicated on April 19, 1959, and Truman was the honored guest.

(Opposite page) The bedroom in which Truman was born is furnished to reflect a midwest home of the late 1800s.
(Right) Visitors to Harry S Truman Birthplace State Historic Site view a birth shrine at the site.
(Bottom) A disc of the Austrian pine tree Truman’s father planted to commemorate his birth is marked along its growth rings.

MoDNR PHOTOS BY BEN NICKELSON



Top Spots for Kayaking



Are you looking for a new way to explore the outdoors? Consider kayaking to experience Missouri waterways.

Missouri state parks have numerous lakes and streams and kayaks are a great way to explore them on your own or with friends. Missouri State Parks offers a Learn to Paddle program that helps teach people this new skill. If you don't have your own kayak, many state parks offer kayak rentals.

Kayaking is possible on many different types of

waterways ranging from large lakes such as Lake of the Ozarks, Stockton Lake and Table Rock Lake to smaller lakes such as Big Lake, Wakonda and Crowder. Three state parks offer aquatic trails, perfect for kayaking.

For more information about kayaking in Missouri's state parks, visit mostateparks.com.

Visitors to Knob Noster State Park, in Johnson County, explore Lake Buteo in kayaks rented from the park.
MoDNR PHOTO BY BEN NICKELSON



(Top) Visitors paddle on Forest Lake at Thousand Hills State Park, near Kirksville.

(Above) Kayaks are lined up before a race at Finger Lakes State Park, Columbia.

(Left) Guests can rent kayaks, paddles and life vests for an aquatic adventure at Knob Noster State Park.

MoDNR PHOTOS BY BEN NICKELSON

trailhighlight

Castlewood State Park



trailhighlight

When it comes to fun and challenging Missouri trails, Castlewood State Park offers something for nearly everyone. Straddling the Meramec River just southeast of St. Louis, the park features eight trails totaling more than 32 miles of hiking, mountain biking and equestrian options.

The trails, with ratings from moderate to rugged, range from those great for first-time hikers and riders to ones that even the most experienced will enjoy. All of the park's trails are open to hikers and trail bikers. In fact, the park is considered one of the best mountain biking locations in the St. Louis area. Three of the park's trails offer horseback riding.

Regardless of how visitors decide to hit Castlewood's trails, fun and adventure await. Some of the trails cross gurgling streams while others offer panoramic views of the Meramec River valley. In the springtime, wildflowers bloom across the park's restored prairie fields and blackberries can be found growing in brambles during the summer months. But regardless of the season, Castlewood's trails abound with birds and other wildlife.

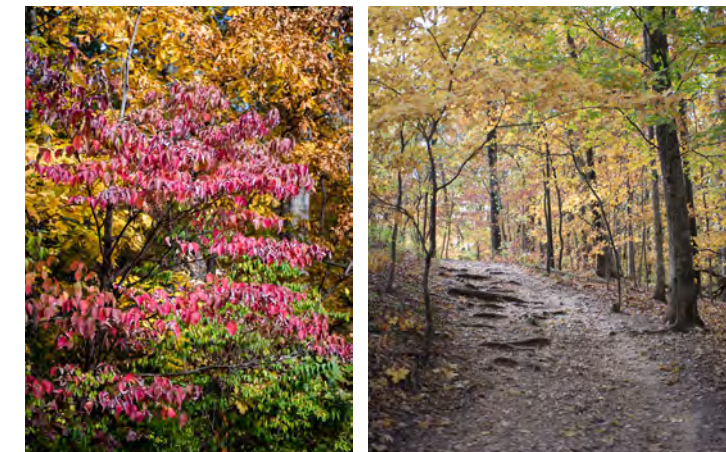
(Opposite page) Hikers enjoy one of eight trails at Castlewood State Park.

(Top) Fall colors explode along the trails.

(Above right) Two hikers and friend take a trail break at an overlook above the Meramec River.

(Bottom right) Park visitors can enjoy a broad vista of the Meramec River valley from several ridgetop vantage points.

MoDNR PHOTOS BY BEN NICKELSON



butnot least

Better Process, Better Service: E³



The department’s Land Reclamation Program/Forms Enhancement Team, left to right: Ashley Harrison, Bill Zeaman, Carey Bridges, Lesley Branch.
MoDNR PHOTO

In 2015, the Missouri Department of Natural Resources began implementing a Lean program, dubbed “E3” for “Enhancing Effectiveness and Efficiency.” E3 is a continuous improvement program focused on making processes more effective and efficient while increasing customer service. The program views every employee as a problem solver and every supervisor as a coach. Employees look at what they did yesterday and relentlessly work to do it more effectively and efficiently today.

The Missouri Geological Survey’s Land Reclamation Program took up the E3 challenge and applied the program’s principles to their Industrial Mineral Permit application form with satisfying results for MoDNR’s regulated operators.

Thirteen teams rose to the first E3 Challenge. Participants at the October Program and Regional Director Meeting voted for their favorite competing team and awarded the first E3 Challenge traveling trophy to the department’s Land Reclamation Program/Forms Enhancement project.

Land Reclamation realized there were some issues with their Industrial Mineral permit application form. They determined Land Reclamation laws and regulations did not require notarized signatures, but the requirement was still on the application form. The team revised the form and made it available on the internet for public access. Removing the notarization

resulted in a number of benefits for operators. Before the change, regulated operators had to take the time to get a notarization and mail in an original form. If a mistake was found on a notarized form, the operator had to make the correction and resubmit the entire form, after having it notarized again. Now, applicants can submit an electronic copy of the form, which reduces their time spent waiting on the application approval process. In addition, if a mistake is found, minor edits can be addressed and the operator need only submit a new page instead of redoing the entire form. As a result of these changes, the time of permit application approval for those with no changes was reduced by 40 percent – from 21 to 13 days. The approval time for applications after one revision went from 46 to 22 days, a 50 percent reduction. Regulated operators are thrilled with this improvement.

E3/Lean is a way of thinking as well as a suite of tools to assist in identifying opportunities and problem solving. The program is ongoing within the department. Stakeholders and regulated entities will experience better customer service with the resources we have without sacrificing our ability to protect the state’s air, land and water, preserve Missouri’s unique natural and historic places, and provide recreational and learning opportunities for everyone.

Congratulations to the team: Ashley Harrison, Bill Zeaman, Carey Bridges and Lesley Branch.



Fall foliage along Katy Trail State Park can be spectacular and the annual Fall Colors Tram Tour offers a comfortable way to experience it. Riders can enjoy the scenery from an open tram car as guides explain the features along the trail.



dnr.mo.gov

